User Manual

AXN-STR

NOTE

Please keep this manual with your AXN-STR.

Serial No.: _____
Model No.: _____

Advance Power Inc.
6331 North State St.
Redwood Valley, CA 95470

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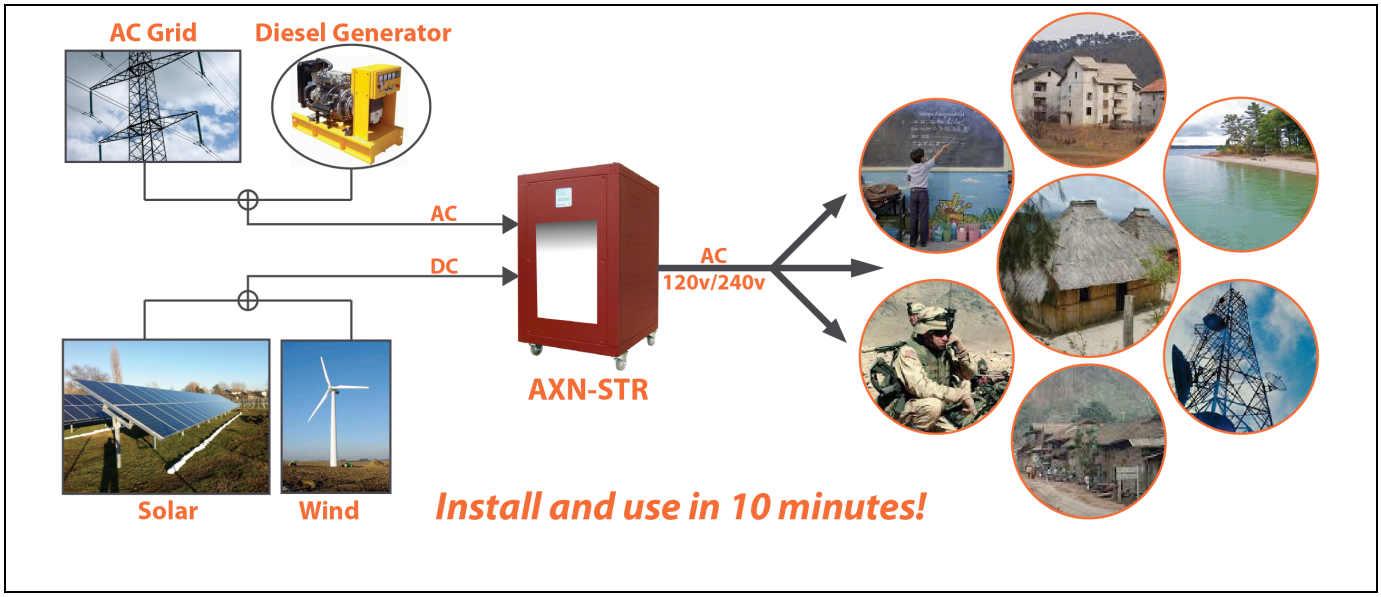
1 Introduction and General Information

Congratulations on your purchase of AXN-STR. Thank you for choosing this product. The AXN-STR has been developed to provide you with years of trouble free operation.

It is important to us that you get the best out of your AXN-STR, so please take a few minutes to read this manual carefully. If you have any comments regarding our products, please contact us.

Keep this manual with your AXN-STR for quick reference at all times. In case of malfunction contact your supplier who is trained trouble-shoot and resolve the issue.



Features:

- Self-sustaining power supply
- High speed charging
- 24/7 power supply
- Compact design
- Fan-less quiet operation
- Peak shaving/load leveling
- Optimize green energy use
- Multiple input sources: solar, wind, diesel, and grid
- Single phase, split phase, 3-phase
- Maintenance free
- Emergency Back-Up
- Power Regulation

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2 Important Safety Notice

Please carefully read and follow the recommended guidelines below before proceeding with installation.

1. All systems must be installed by a licensed electrician or accredited solar installer.
2. Setup the AXN-STR according to the steps detailed in the user manual.
3. **Do not take apart the AXN-STR parts on your own. This system is a high voltage equipment.** Mishandling it could result in electric shocks or fire. The manufacturer does not take responsibility for such accidents.
4. In order to reduce the risk or system damage, please do not cover the casing or place extra objects on top of it, which may inhibit the system's ability to radiate or damage the casings.
5. Please do not randomly switch the breakers attached to the system on and off.
6. Please do not touch the terminals after system activation.
7. This machine is not designed for outdoor use. Do not expose the unit to direct sunlight, rain, splashing water and salt spray. Install it in a dry, salt-free location with adequate ventilation.
8. Please place the system upright in a well-ventilated area, and keep a minimum distance of 30 cm between the system and the back wall.
9. In the event of connecting an on-grid system, please wire while the breakers are flipped off.
10. If the system is not activated, grid power will automatically bypass from AC in terminal to AC out terminal.
11. The AC terminals provided in the system are 1.5kW, for higher load requirements, please connect to the "OFF GRID AC OUT" terminal on the back.
12. For wires connecting the Grid distribution panel to the AC IN terminal, please use a 60A protective switch and 14mm^2 wires; for the rest of the wiring use standard wires.

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3 Product Information

3.1 Product Description

The AXN-STR is a complete storage solution with the intended use of maximizing the use of solar power systems and creating a self-sustaining power plant. It includes a high voltage lithium battery pack, a true sine wave inverter, a charger system capable of taking in from both PV and gird sources, and an BMS(Battery Management System)/All-In-One control panel that manage the complex device. The unit is designed to charge up from either photovoltaic (PV) solar array DC power or standard AC gird power and then feed back into the local load appliances.

- AXN-STR has 4 to 16 separate MPPT PV input ports depending on model.
- AXN-STR employs several breakthrough designs to achieve maximum efficiency, including a fan-less cooling design that allows for a completely silent operation, high voltage batteries and efficient BMS.
- AXN-STR configures to a variety of setups that allows it to also function in the role of a UPS system during power outage or a Peak Saving device to take advantage of local utility rates.
- AXN-STR is operated through an LCD display on the front panel. It is generally setup from the factory as a plug and play device, which requires minimal setup on the part of end users.
- AXN-STR is fully CEC/IEC certified, confirming to the following standards:

  IEC 62109-1 / IEC 62109-2 / IEC 62019-1 /IEC 62040-1

  IEC 62040-2 / IEC 61000-6-2 / IEC 61000-6-3 / IEC 50178

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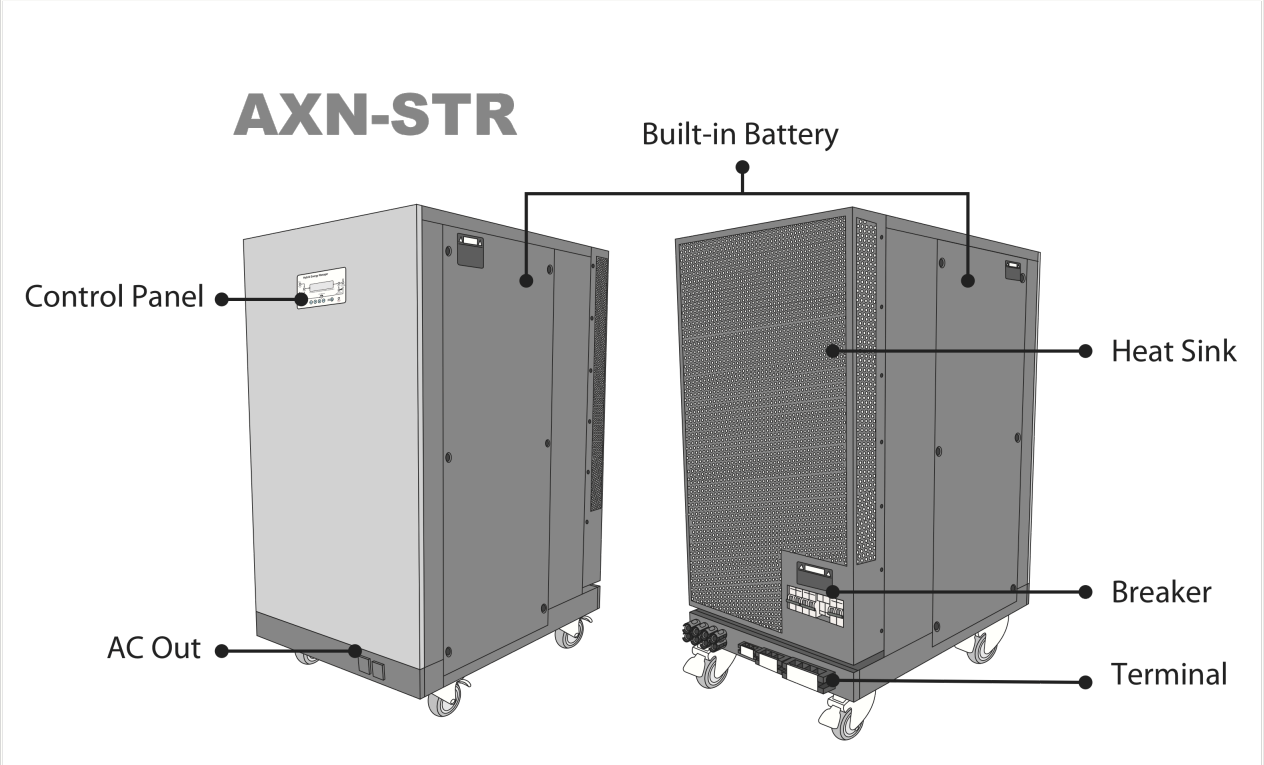
3.2 Product Overview



- **Control Panel:** The display and control panel for operating status and alarm
- **AC Out:** Standard 1.5kW AC power socket
- **Built-in Battery:** High voltage lithium battery system
- **Heat Sink:** Dissipates heat produced by AXN-STR
- **Breaker:** System 4-pin and 2-pin circuit breaker
- **Terminal:** DC and AC terminal connections

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3.3 Product Specification

3.3.1 AXN-STR16kWh 10kVA Single Phase

Electrical Characteristics	Item	AXN-STR16kWh
Energy	Energy Storage	16kWh
Voltage		400V
Nominal Capacity		40Ah
Nominal Output Voltage	AC Output: (Independent Off-Grid Output)	True Sine Wave 120/240Vac 60Hz Split Phase
Nominal Output Current (L-L)		34A
Maximum Output Current (Instant)		50A
Surge Output Power (L-L)		16kW/12kW (Instant/15 seconds)
Continuous Output Power in FTS		10kVA
Nominal Output Power	DC Output: (On-Grid Output for external GTI)	5000W
Nominal Output Current		15A
Nominal Output Voltage		400Vdc
Nominal Input Current	AC Input: Grid Charger	25A
Nominal Input Power		5000W
Nominal Input Voltage		240Vac
Maximum Input Current (Instant)		28A
Nominal Input Current	DC (PV) Input: PV Charger	10A x 4
Nominal Input Voltage		400Vdc
Maximum Input Voltage		500Vdc
Maximum Input Current (Instant)		12A x 4
Input Type		PV x 4 (MPPT)
Input Voltage Range		170 ~ 500Vdc

Storage Characteristics	AXN-STR16kWh
Battery Style	Li-Ion
Voltage	400V
Nominal Capacity	40Ah
Number of cycles	3000/5000 (90%/50% left @ 80% DOD)
Battery Charge Voltage	432V ± 0.5V
Battery Charge Cut Off Voltage	470V
Battery Protection	OVP/UVP/OCP/OTP
Maximum Charge Current	36A
Maximum Discharge Current	30A
Nominal Charge Current	30A
Continuous Discharge Current	25A
Charge Method	CC/CV
Battery charge voltage	432 ± 0.5V
Battery Charge Cut Off Voltage	470V
Self-consumption	Standby < 1W, No Load < 10W (Battery); Standby < 10W, No Load < 60W (Energy Manager)
Internal Resistance	≤10μΩ

Temperature Coefficients	
Operating Temperature	-35° to +60°C / -31° to 140°F
Max Internal Temperature	+60°C System shut down
Status	LED (Battery); LCM (Energy Manager)

Mechanical Characteristics	AXN-STR16kWh
Dimensions (HxDxW)	100.7cm x 50cm x 70cm
Weight	260kg
Water and Dust Proof Level	Indoor Type (IP65/IP67/IP68 available upon request)

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3.3.2 AXN-STR19kWh 10kVA Single Phase

Electrical Characteristics	Item	AXN-STR19kWh
Energy	Energy Storage	19kWh
Voltage		400V
Nominal Capacity		47.5Ah
Nominal Output Voltage	AC Output: (Independent Off-Grid Output)	True Sine Wave 120/240Vac 60Hz Split Phase
Nominal Output Current (L-L)		34A
Maximum Output Current (Instant)		50A
Surge Output Power (L-L)		16kW/12kW (Instant/15 seconds)
Continuous Output Power in FTS		10kVA
Nominal Output Power	DC Output: (On-Grid Output for external GTI)	5000W
Nominal Output Current		15A
Nominal Output Voltage		400Vdc
Nominal Input Current	AC Input: Grid Charger	25A
Nominal Input Power		5000W
Nominal Input Voltage		240Vac
Maximum Input Current (Instant)		28A
Nominal Input Current	DC (PV) Input: PV Charger	10A x 4
Nominal Input Voltage		400Vdc
Maximum Input Voltage		500Vdc
Maximum Input Current (Instant)		12A x 4
Input Type		PV x 4 (MPPT)
Input Voltage Range		170 ~ 500Vdc

Storage Characteristics	AXN-STR19kWh
Battery Style	Li-Ion
Voltage	400V
Nominal Capacity	47.5Ah
Number of cycles	3000/5000 (90%/50% left @ 80% DOD)
Battery Charge Voltage	432V ± 0.5V
Battery Charge Cut Off Voltage	470V
Battery Protection	OVP/UVP/OCP/OTP
Maximum Charge Current	36A
Maximum Discharge Current	30A
Nominal Charge Current	30A
Continuous Discharge Current	25A
Charge Method	CC/CV
Battery charge voltage	432 ± 0.5V
Battery Charge Cut Off Voltage	470V
Self-consumption	Standby < 1W, No Load < 10W (Battery); Standby < 10W, No Load < 60W (Energy Manager)
Internal Resistance	≤10μΩ

Temperature Coefficients	
Operating Temperature	-35° to +60°C / -31° to 140°F
Max Internal Temperature	+60°C System shut down
Status	LED (Battery); LCM (Energy Manager)

Mechanical Characteristics	AXN-STR19kWh
Dimensions (HxDxW)	100.7cm x 50cm x 70cm
Weight	300kg
Water and Dust Proof Level	Indoor Type (IP65/IP67/IP68 available upon request)

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3.3.3 AXN-STR31kWh 10kVA Single Phase

Electrical Characteristics	Item	AXN-STR31kWh
Energy	Energy Storage	31kWh
Voltage		400V
Nominal Capacity		77.5Ah
Nominal Output Voltage	AC Output: (Independent Off-Grid Output)	True Sine Wave 120/240Vac 60Hz Split Phase
Nominal Output Current (L-L)		34A
Maximum Output Current (Instant)		50A
Surge Output Power (L-L)		16kW/12kW (Instant/15 seconds)
Continuous Output Power in FTS		10kVA
Nominal Output Power	DC Output: (On-Grid Output for external GTI)	5000W
Nominal Output Current		15A
Nominal Output Voltage		400Vdc
Nominal Input Current	AC Input: Grid Charger	25A
Nominal Input Power		5000W
Nominal Input Voltage		240Vac
Maximum Input Current (Instant)		28A
Nominal Input Current	DC (PV) Input: PV Charger	10A x 4
Nominal Input Voltage		400Vdc
Maximum Input Voltage		500Vdc
Maximum Input Current (Instant)		12A x 4
Input Type		PV x 4 (MPPT)
Input Voltage Range		170 ~ 500Vdc

Storage Characteristics	AXN-STR31kWh
Battery Style	Li-Ion
Voltage	400V
Nominal Capacity	77.5Ah
Number of cycles	3000/5000 (90%/50% left @ 80% DOD)
Battery Charge Voltage	432V ± 0.5V
Battery Charge Cut Off Voltage	470V
Battery Protection	OVP/UVP/OCP/OTP
Maximum Charge Current	36A
Maximum Discharge Current	30A
Nominal Charge Current	30A
Continuous Discharge Current	25A
Charge Method	CC/CV
Battery charge voltage	432 ± 0.5V
Battery Charge Cut Off Voltage	470V
Self-consumption	Standby < 1W, No Load < 10W (Battery); Standby < 10W, No Load < 60W (Energy Manager)
Internal Resistance	≤10μΩ

Temperature Coefficients	
Operating Temperature	-35° to +60°C / -31° to 140°F
Max Internal Temperature	+60°C System shut down
Status	LED (Battery); LCM (Energy Manager)

Mechanical Characteristics	AXN-STR31kWh
Dimensions (HxDxW)	100.7cm x 50cm x 70cm
Weight	456kg
Water and Dust Proof Level	Indoor Type (IP65/IP67/IP68 available upon request)

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3.3.4 AXN-STR60kWh 30kVA 3 Phase

Electrical Characteristics	Item	AXN-STR60kWh
Energy	Energy Storage	60kWh
Voltage		400V
Nominal Capacity		150Ah
Nominal Output Voltage	AC Output: (Independent Off-Grid Output)	True Sine Wave 415Vac 50Hz 3 Phase (Customized 380 ~ 500Vac)
Nominal Output Current (L-L)		70A
Maximum Output Current (Instant)		150A
Surge Output Power (L-L)		90kVA/60kVA (Instant/15 seconds)
Continuous Output Power in FTS		30kVA
Nominal Output Power	DC Output: (On-Grid Output for external GTI)	Customer specified
Nominal Output Current		Customer specified
Nominal Output Voltage		Customer specified
Nominal Input Current	AC Input: Grid Charger	12A (Customized)
Nominal Input Power		5000W (Customized)
Nominal Input Voltage		415Vac (Customized 380 ~ 500Vac)
Maximum Input Current (Instant)		15A (Customized)
Nominal Input Current	DC (PV) Input: PV Charger	10A x 8
Nominal Input Voltage		400Vdc
Maximum Input Voltage		500Vdc
Maximum Input Current (Instant)		12A x 8
Input Type		PV x 8 (MPPT) 4kWp per MPPT
Input Voltage Range		170 ~ 500Vdc

Storage Characteristics	AXN-STR60kWh
Battery Style	Li-Ion
Voltage	400V
Nominal Capacity	150Ah
Number of cycles	3000/5000 (90%/50% left @ 80% DOD)
Battery Charge Voltage	432V ± 0.5V
Battery Charge Cut Off Voltage	500V
Battery Protection	OVP/UVP/OCP/OTP
Maximum Charge Current	70A
Maximum Discharge Current	70A
Nominal Charge Current	60A
Continuous Discharge Current	60A
Charge Method	CC/CV
Battery charge voltage	432 ± 0.5V
Battery Charge Cut Off Voltage	500V
Self-consumption	Standby < 1W, No Load < 10W (Battery); Standby < 10W, No Load < 60W (Energy Manager)
Internal Resistance	≤10μΩ

Temperature Coefficients	
Operating Temperature	-35° to +60°C / -31° to 140°F
Max Internal Temperature	+60°C System shut down
Status	LED (Battery); LCM (Energy Manager)

Mechanical Characteristics	AXN-STR60kWh
Dimensions (HxDxW)	119.2cm x 110cm x 64.8cm
Weight	600kg
Water and Dust Proof Level	Indoor Type (IP65/IP67/IP68 available upon request)

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3.3.5 AXN-STR120kWh 60kVA 3 Phase

Electrical Characteristics	Item	AXN-STR120kWh
Energy	Energy Storage	120kWh
Voltage		400V
Nominal Capacity		300Ah
Nominal Output Voltage	AC Output: (Independent Off-Grid Output)	True Sine Wave 415Vac 50Hz 3 Phase (Customized 380 ~ 500Vac)
Nominal Output Current (L-L)		140A
Maximum Output Current (Instant)		260A
Surge Output Power (L-L)		150kVA/120kVA (Instant/15 seconds)
Continuous Output Power in FTS		60kVA
Nominal Output Power	DC Output: (On-Grid Output for external GTI)	Customer specified
Nominal Output Current		Customer specified
Nominal Output Voltage		Customer specified
Nominal Input Current	AC Input: Grid Charger	12A (Customized)
Nominal Input Power		5000W (Customized)
Nominal Input Voltage		415Vac (Customized 380 ~ 500Vac)
Maximum Input Current (Instant)		15A (Customized)
Nominal Input Current	DC (PV) Input: PV Charger	10A x 16
Nominal Input Voltage		400Vdc
Maximum Input Voltage		500Vdc
Maximum Input Current (Instant)		12A x 16
Input Type		PV x 16 (MPPT) 4kWp per MPPT
Input Voltage Range		170 ~ 500Vdc

Storage Characteristics	AXN-STR120kWh
Battery Style	Li-Ion
Voltage	400V
Nominal Capacity	300Ah
Number of cycles	3000/5000 (90%/50% left @ 80% DOD)
Battery Charge Voltage	432V ± 0.5V
Battery Charge Cut Off Voltage	500V
Battery Protection	OVP/UVP/OCP/OTP
Maximum Charge Current	160A
Maximum Discharge Current	160A
Nominal Charge Current	150A
Continuous Discharge Current	150A
Charge Method	CC/CV
Battery charge voltage	432 ± 0.5V
Battery Charge Cut Off Voltage	500V
Self-consumption	Standby < 1W, No Load < 10W (Battery); Standby < 10W, No Load < 60W (Energy Manager)
Internal Resistance	≤10μΩ

Temperature Coefficients	
Operating Temperature	-35° to +60°C / -31° to 140°F
Max Internal Temperature	+60°C System shut down
Status	LED (Battery); LCM (Energy Manager)

Mechanical Characteristics	AXN-STR120kWh
Dimensions (HxDxW)	119.2cm x 110cm x 64.8cm
Weight	1150kg
Water and Dust Proof Level	Indoor Type (IP65/IP67/IP68 available upon request)

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4 Installation

ALL SYSTEMS MUST BE INSTALLED BY A LICENSED ELECTRICIAN OR ACCREDITED SOLAR INSTALLER

4.1 Unpacking Inspection

Open the packing box of AXN-STR and take it out. Check for any damage during the process of transportation. Should any damage be observed or parts found missing, do not start the system. Contact your sales representative immediately.

Accessories: MC4 cable coupler (male/female) (1 set)

Back cover plate

Hanging bolt (2pcs)

4.2 Selecting the Install Location

Take the following requirements into consideration when selecting the best location for your AXN-STR:

1) DO NOT expose the AXN-STR to direct sunlight. Direct sunlight increases the internal temperature of the AXN-STR, which reduces its conversion efficiency.

2) DO NOT expose the AXN-STR to rain, splashing water, or salt spray. Install it in a dry, salt-free location with adequate ventilation.

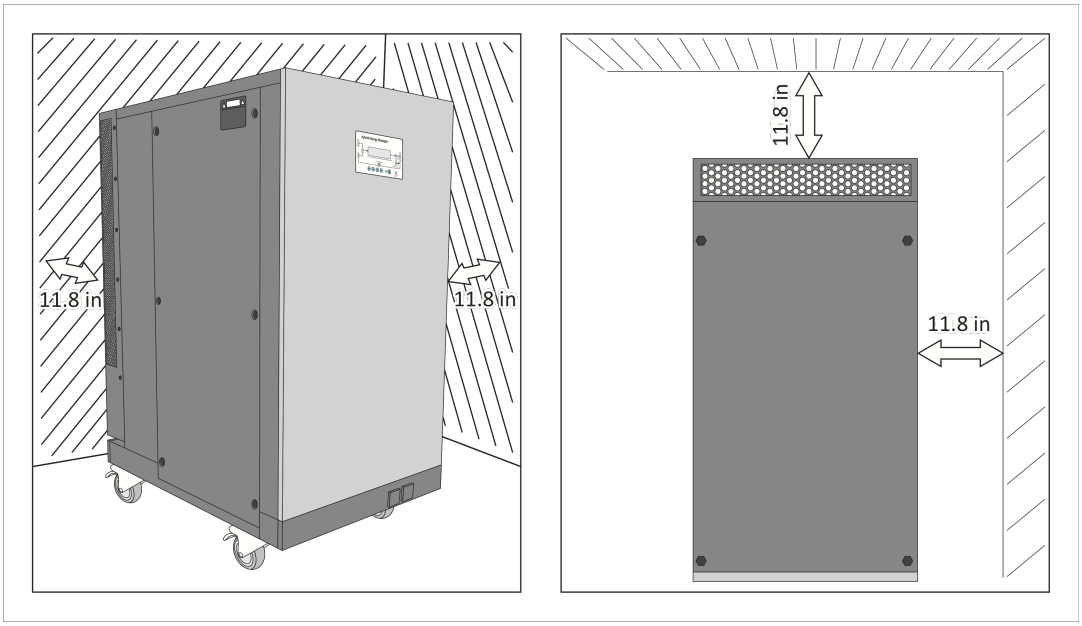
3) DO NOT cover the casing or place objects on top, which may inhibit the system's ability to radiate heat or damage the casing.

4) The install method and location must be suitable for the weight and dimensions of the system.

5) The install location must be clear and accessible at all times without the use of additional aids such as scaffolding or lifting platform. Non-fulfillment of these criteria may restrict execution of servicing.

6) Provide adequate cooling space around the AXN-STR.

7) The system should always have a clearance space of 30cm at the rear and 30cm on its side.



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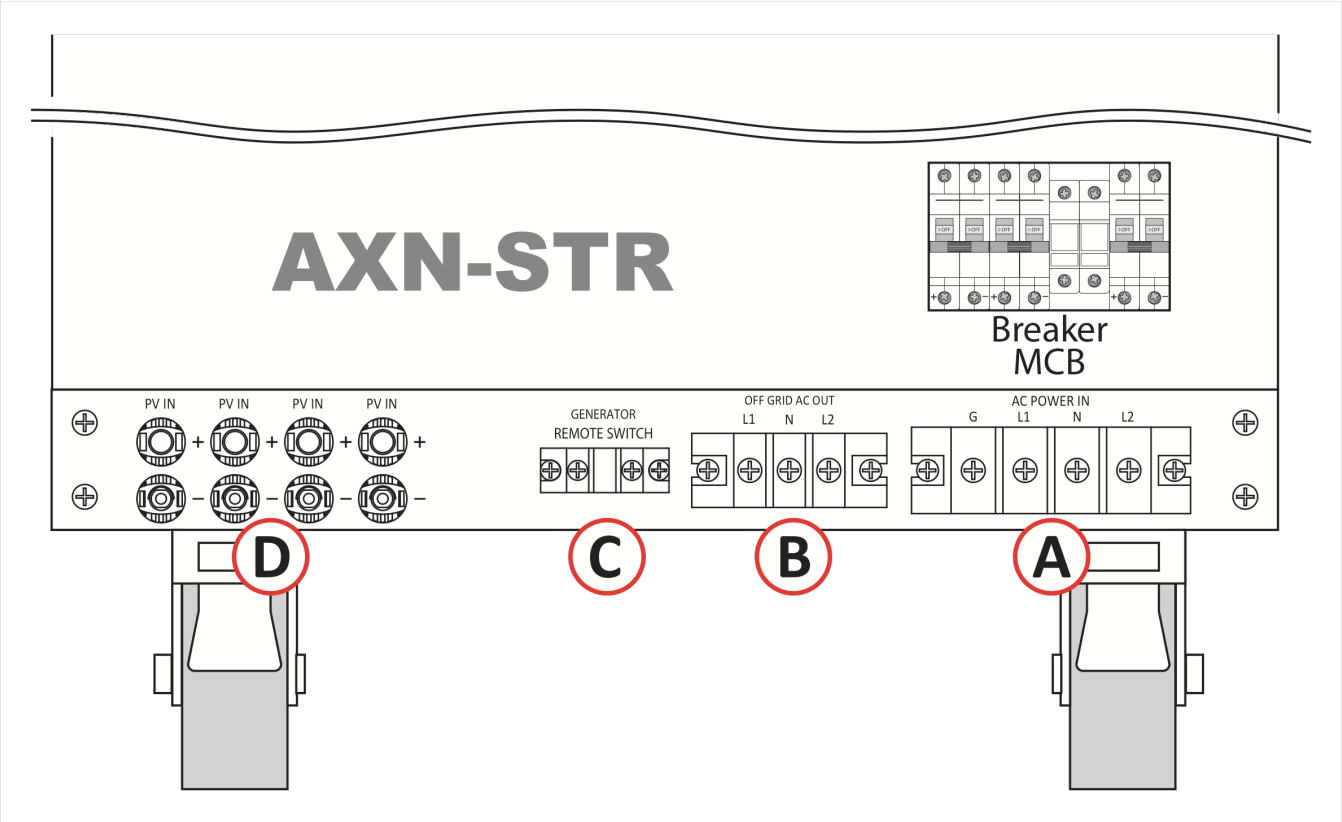
4.3 Overview of the Connection Area



(A) AC POWER IN: Connected to AC mains grid for the purpose of either charging battery or bypassing in the event of battery running low.

(B) OFF GRID AC OUT: Connected to loads from the battery or grid power via bypassing in the event of battery loss.

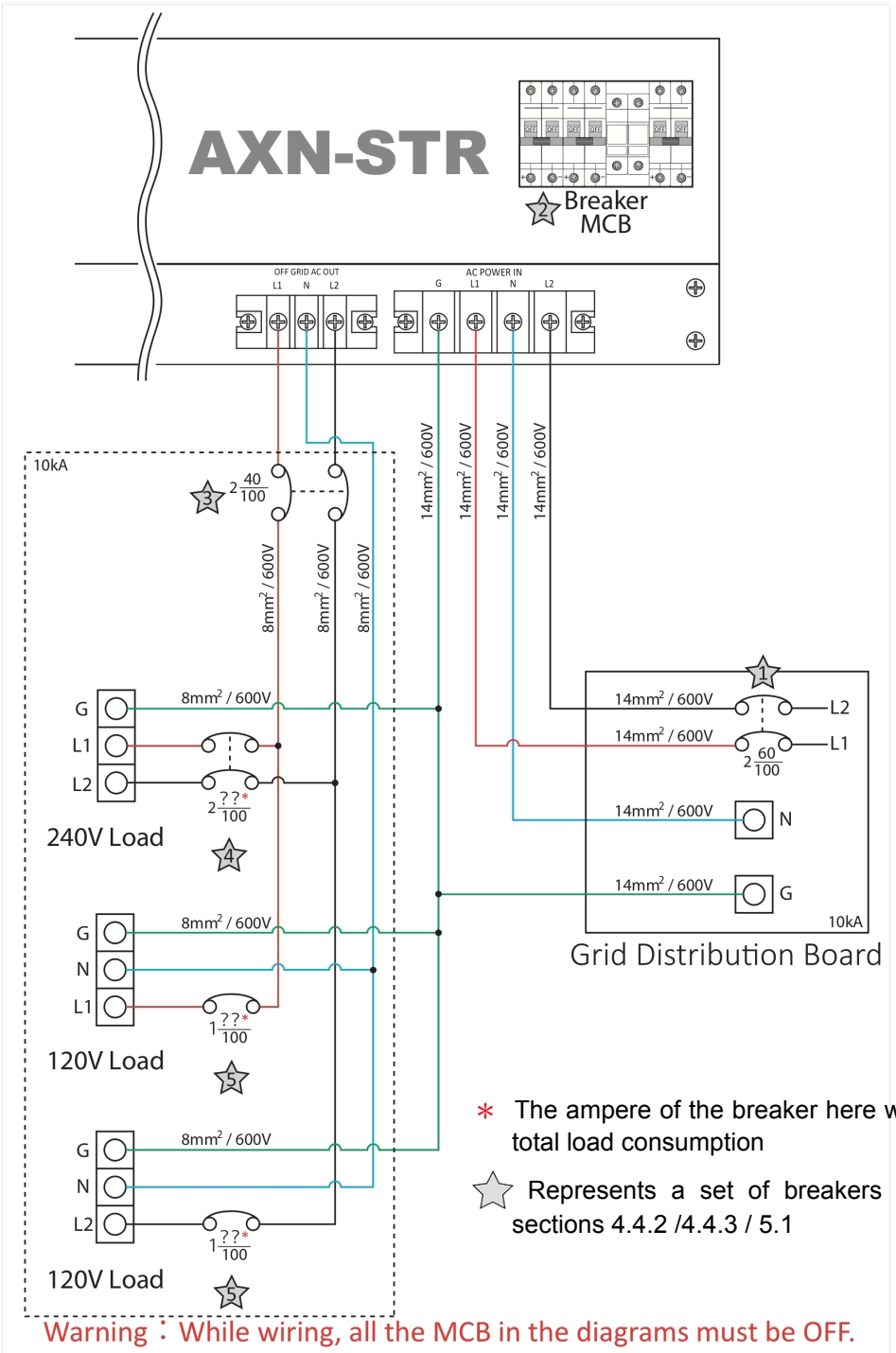
(C) Generator Remote Switch: Connected to generator for the purpose of activating the generator for either charging battery or bypassing in the event of battery running low.

NOTE: Check with local utility policy if this operation is allowed.

(D) PV IN: PV array input.

4.4 Electrical Installation

4.4.1 Connection Diagram of AC IN and AC OUT


AXN-STR
Breaker MCB
OFF GRID AC OUT
L1 N L2
AC POWER IN
G L1 N L2
10kA
8mm² / 600V
14mm² / 600V
240V Load
120V Load
Grid Distribution Board
* The ampere of the breaker here will vary due to total load consumption
Represents a set of breakers referred to in sections 4.4.2 /4.4.3 / 5.1
Warning：While wiring, all the MCB in the diagrams must be OFF.

WARNING: While wiring, all the breakers and AC Main grid must be OFF.

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4.4.2 Connection Instruction of AC IN

1) Before connecting AXN-STR to the AC grid, please check following:

1-1) Confirm the AC grid input voltage is within the range 200V-240Vac. These are the under- and over-voltage protection limits beyond which AXN-STR will not generate any power. Ensure that the grid voltage does not exceed 260Vac under any conditions or AXN-STR may be damaged.

1-2) Confirm that the AC frequency is 50, 57 or 60Hz. If not, AXN-STR will not generate any power.

2) For Safety reason, installer MUST make sure that a 2P 60Amp circuit breaker (1) is installed between the L1/L2 terminal of AC POWER IN and Grid Distribution Board. Use 14mm^2/600V wires to connect the L1/L2/N/G terminals between AC POWER IN and Grid Distribution Board. Before wiring L1/L2/N to AC POWER IN, please take measurements of the L1/N and L2/N voltage (120V) and L1/L2 Voltage (240V) respectively.

WARNING: Do not connect the wires in the wrong order, faulty connections will cause damage to the system.

4.4.3 Connection Instruction of AC OUT

1) For Safety reason, installer MUST make sure that a 2P 40Amp circuit breaker (3) is installed in the L1/L2 terminal between the load and OFF GRID AC OUT.

2) Connecting to the Load

2-1) Connecting to 240V Load

Use 8mm^2/600V wires to connect the L1/L2 terminals between the load and OFF GRID AC OUT, also add another 2P circuit breaker (4) between the L1/L2 Terminal and Breaker (3). Before wiring L1/L2 with Breaker (3) measure and confirm that they are at 240V. If the load has a G terminal, use 8mm^2/600V wires to link it with the G wire on AC POWER IN.

2-2) Connecting to 120V Load

Use 8mm^2/600V wires to connect the L1/N and L2/N terminal between the load and OFF GRID AC OUT, and add another 1P circuit breaker (5) between the L1/L2 Terminal and Breaker (3). Before wiring L1/N and L2/N with Breaker (3) measure and confirm that they are at 120V. Please do not wire just the L1/N or L2/N There must be even distribution of L1/N and L2/N, the power difference cannot exceed 2KW. If the load has a G terminal, use 8mm^2/600V wires to link it with the G wire on AC POWER IN.

Note:

1. The load's total power output cannot exceed that of the OFF GRID AC OUT, or it will cause damage to the system.

2. The ampere of Breaker (4) and Breaker (5) will change depending on the different power outputs. A certified installer should select the proper equipment.

WARNING: Do not connect the wires in the wrong order. Faulty connections will cause damage to the system

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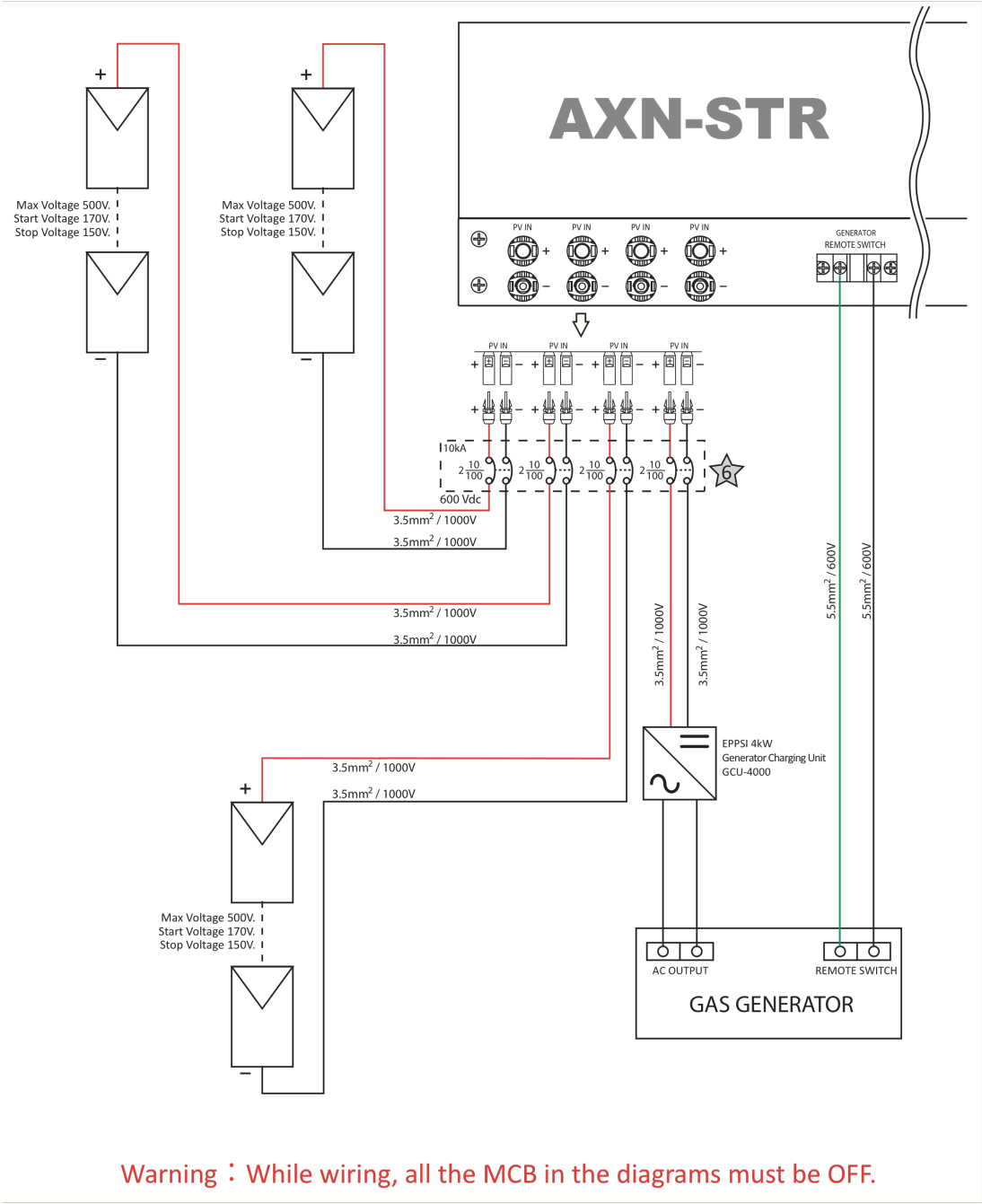
4.4.4 Connection Diagram of External On Grid Inverter and PV Array



WARNING: While wiring, all the breakers and AC Main grid must be OFF.

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4.4.5 Wiring Instruction to Generator

1) Use 5.5mm^2/600V wires to connect the terminal between Generator and Generator Remote Switch in order to activate the Generator by AXN-STR.

2) Use 3.5mm^2/1000V wires to connect the terminal between Generator, Generator Charging Unit (GCU) and PV IN. Add another 2P 10Amp 600Vdc circuit breaker(6) between GCU and PV IN. Through GCU, Generator AC source will be transformed to DC source and charge AXN-STR via PV IN terminal.

NOTE: GCU is required for external Generator (AC) to charge AXN-STR. It is sold separately.

4.4.6 Connection Instruction of PV Array

Use 3.5mm^2/1000V wires to connect the PV+/PV- terminal between the PV Array and PV IN, and add another 2P 10Amp 600Vdc circuit breaker (6) on the PV+/PV- wires. Before connecting the PV+/PV- wires to Breaker (6), please measure to confirm that the PV+/PV- wire's voltage has not exceeded that of the maximum input voltage listed for PV IN. AXN-STR comes with Tyco cable coupler, please use these to connect with MC4 receptacle of PV IN.

Note:

1. The Conditions for PV Array input voltage is

   Max Voltage: 500V

   Start Voltage: 170V

   Stop Voltage: 150V

2. PV string size is based on the VOC of each PV panel. The max total voltage should be less than 500V.

NOTE: Please take into temperature correction while calculating max voltage.

3. The above describes the method to connecting one PV array, if the system comes with 4 PV arrays, then repeat the above process for each Array.

Warning: Do not connect the wires in the wrong order. Faulty connections will cause damage to the system

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5 Activation & Shutdown

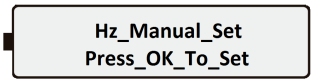
5.1 Activation

1) Please turn on the breakers in the order of Breaker (1) > Breaker (5)~ Breaker (6)

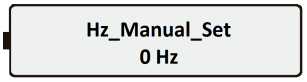
Note: When turning on Breaker (2), make sure you first turn on 4-Pin breaker and then 2-Pin breaker. (Reference sections 4.4.1 and 4.4.4)

2) Press ⏻ for 5 seconds to start up the system. Once the system starts it will first display frequency setting:

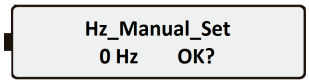
2-1) In the event that there is **NO grid AC input**, the control panel will display "Hz_Manual_Set". Press OK to start setting up the AC outlet frequency.



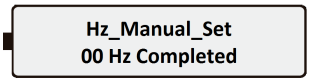
Press ▲ and ▼ to adjust frequency, press OK to finish.



After finishing the frequency setting, you will enter the display. If the frequency displayed is the one you had set, press OK to confirm. If you wish to edit it again, press SET to go back to the previous page.

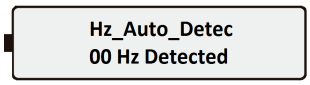


After pressing OK to confirm, the panel will display the following message to indicate confirmation of setup.



2-2) In the event that there is grid AC input, the control panel will display "Hz_Auto_Detec", then system will automatically detect frequency.

When system has finished auto detecting, it will display a message of confirmation.



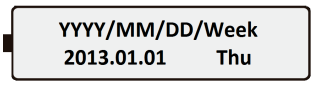
Once the frequency setting is finished, the display will show the current battery capacity. (Reference to section 6.3.1)

AUXIN SOLAR

5.2 Shutdown

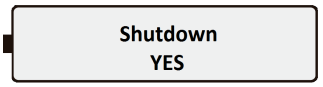
Method 1: Shut down the system from the control panel.

1-1) Press (SET). Go to section 6.3.2 Basic Setting Display.



1-2) After entering basic setting display, press ▲ or ▼ to navigate into shutdown, then press (OK).

1-3) Once there, select YES to shut down the system, press (OK) to confirm deactivation.



Method 2: Shut down through the breakers.

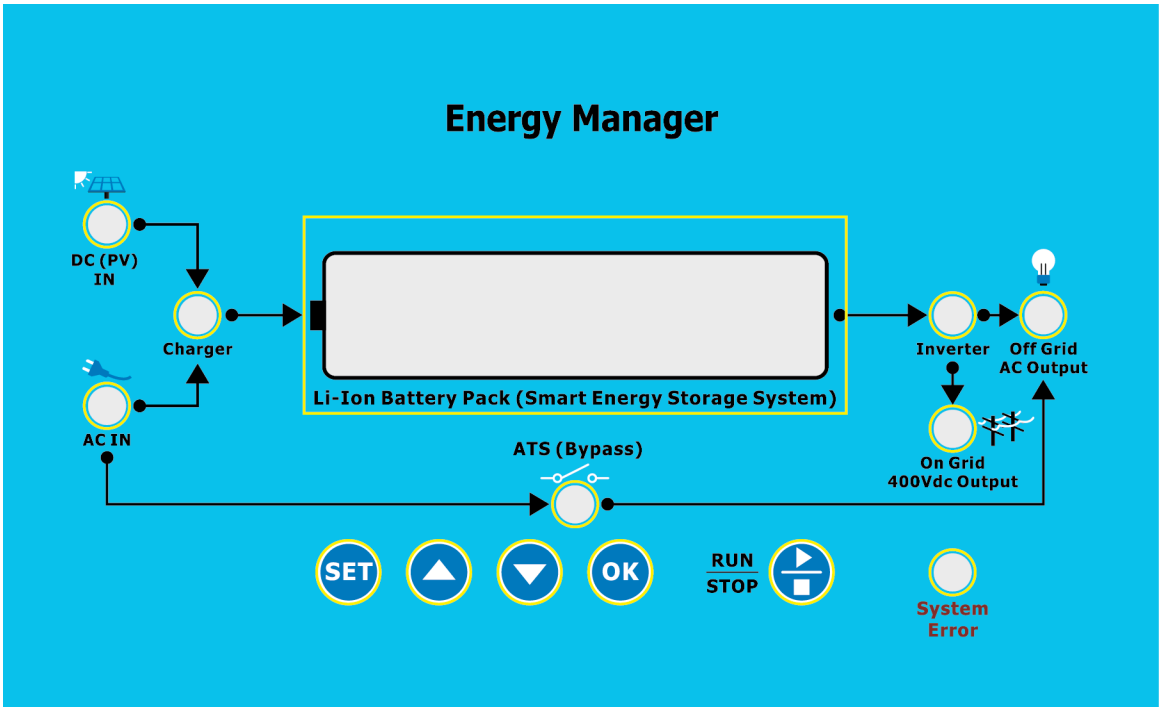
2-1) Breaker (6), MUST be the first one to shut down

2-2) Followed by Breaker (2), (First turn off 4-Pin breaker and then 2-Pin breaker.)

AUXIN SOLAR

6 Display & Operation

6.1 LED Display



Item	LED light	Status
DC (PV) IN	Green	PV input
Charger	Green	Grid or PV is charging the battery
AC IN	Orange	Grid input
ATS (Bypass)	Orange	Load is supplied through grid bypass When battery is not able to discharge, ATS LED will light up even without the grid input
Inverter	Green	Battery is supplying Off Grid AC loads
On Grid 400Vdc Output	Green	Feeding 400Vdc to external grid tie inverter **(Not-applicable)**
Off Grid AC Output	Orange	Feeding Off Grid AC
System Error	Red	System error

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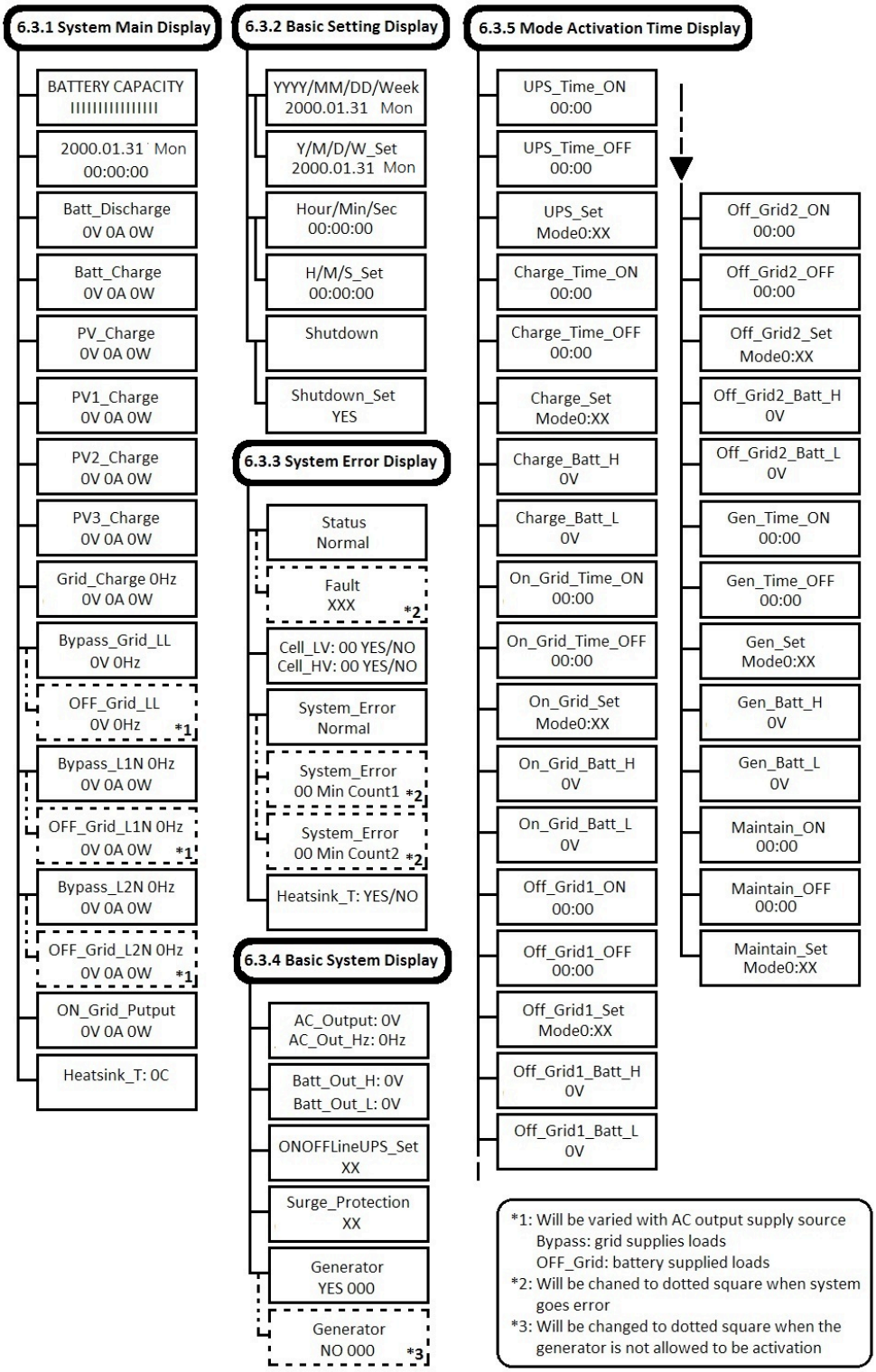
6.2 LCD Display



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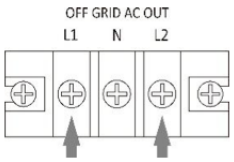
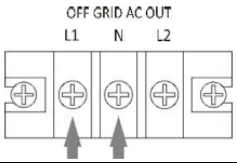
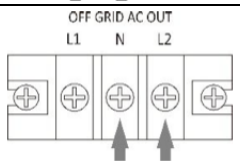
6.3 LCD Message & Operating

Press ⏻ for 5 seconds to start up the system. It will display the battery capacity.

6.3.1 System Main Display

Display	Description
BATTERY CAPACITY	Display with 16 bars. 2 bars represent a single unit. When only 4 bars left, it will flash every 2 seconds. When only 2 bars left, it will flash every 1 second.
2013.01.31 Thu 00:00:00	Date (Year/Month/Date/Week) Time (Hour:Minute:Second)
Batt_Discharge	Battery discharging status
Batt_Charge	Battery charging status
PV_Charge	PV charging status
PV1_Charge	PV1 charging status
PV2_Charge	PV2 charging status
PV3_Charge	PV3 charging status
Grid_Charge	Grid charging status
Bypass_Grid_LL (OFF_Grid_LL)	Display type of power source supplies the loads from L1 and L2 terminal Bypass_Grid_LL: Grid (ATS) supplies the loads OFF_Grid_LL: Battery supplies the load 
Bypass_L1N (OFF_Grid_L1N)	Display type of power source supplies the loads from L1 and N terminal Bypass_L1N: Grid (ATS) supplies the loads OFF_Grid_L1N: Battery supplies the load 
Bypass_L2N (OFF_Grid_L2N)	Display type of power source supplies the loads from L2 and N terminal Bypass_ L2N: Grid (ATS) supplies the loads OFF_Grid_L2N: Battery supplies the load 
ON_Grid_Output	Inverter status
Heatsink_T:	Heat sink temperature *If the temperature <25C, it will only show <25C.

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6.3.2 Basic Setting Display

Press (SET) once to enter the basic setting page.

Display	Description & Adjustment	
YYYY/MM/DD/Week	**Date**	Press (OK) to enter setup (Y/M/D/W_set)
Y/M/D/W_set	Press (▲) or (▼) to change setting and press (OK) to confirm in the order of year / month / date / week. When you are finished, press (OK) again to complete setup.	
Hour/Min/Sec	**Time**	Press (OK) to enter setup (H/M/S_set)
H/M/S_set	Press (▲) or (▼) to change setting and press (OK) to confirm in the order of hour / minute / second. When you are finished, press (OK) again to complete setup.	
Shutdown	**Manual shutdown**	Press (OK) to enter setup (Shutdown_Set)
Shutdown_Set	Select YES and then press (OK) to complete.	

6.3.3 System Error Display

Press (SET) twice to enter the system error page.

Display		Description
Status Normal	Fault XX	Status Normal: Normal Fault: Reference to 9.1 Fault Message and Solution
Cell_LV: 00 YES/NO Cell_HV: 00 YES/NO		No: Cell functional Yes: Cell does not discharge due to low voltage
		No: Cell functional Yes: Cell does not charge due to high voltage
System_Error Normal	System_Error 00Min Count1	Normal: Normal If AXN-STR appears with system error, it will clear the error automatically once, then the LCD will display: 00Min Count1: Will start a 10 minute counter to check if system error appears again. 00Min Count2: If system error appears again within 10 minutes, the display will show the stopping time.
	System_Error 00Min Count2	
Heatsink_T: YES/NO		YES: Heat sink is over temperature NO: Heat sink is normal

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6.3.4 Basic System Display

Press SET 3 times to enter basic system page.

Display	Description
AC_Output: 0V AC_Out_Hz: 0Hz	Output voltage Output frequency
Batt_Out_H: 0V Batt_Out_L: 0V	H: Battery starts discharging voltage L: Battery stops discharging voltage
ONOFFLineUPS_Set	ON_LINE_UPS OFF_LINE_UPS Night_ON_LINE: When grid is available, the system will automatically switch to ON LINE UPS; when grid is unavailable, the system will automatically switch to OFF LINE UPS.
Surge_Protection	High: Will stop discharging when encountering abnormality Low: Will NOT stop discharging when encountering abnormality
Generator	YES: Generator can be activated NO: Generator can NOT to be activated

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6.3.5 Mode Activation Time Display

Press (SET) 4 times to enter mode activation time page.

Display	Mode	Description
UPS_Time_ON	UPS	Battery starts discharging time
UPS_Time_OFF		Battery stops discharging time
UPS_Set		Mode1: ON; Mode2: OFF; Mode3: PROG
Display	**Mode**	**Description**
Charge_Time_ON	Charge	Battery starts charging time
Charge_Time_OFF		Battery stops charging time
Charge_Set		Mode1: ON; Mode2: OFF; Mode3: PROG
Charge_Batt_H		Battery stops charging voltage
Charge_Batt_L		Battery starts charging voltage
Display	**Mode**	**Description**
On_Grid_Time_ON	On Grid	Battery starts discharging time
On_Grid _Time_OFF		Battery stops discharging time
On_Grid _Set		Mode1: ON; Mode2: OFF; Mode3: PROG
On_Grid _Batt_H		Battery starts discharging voltage
On_Grid _Batt_L		Battery stops discharging voltage
Display	**Mode**	**Description**
Off_Grid1_ON	Off Grid1	Battery starts discharging time
Off_Grid1_OFF		Battery stops discharging time
Off_Grid1_Set		Mode1: ON; Mode2: OFF; Mode3: PROG
Off_Grid1_ Batt_H		Battery starts discharging voltage
Off_Grid1_ Batt_L		Battery stops discharging voltage
Display	**Mode**	**Description**
Off_Grid2_ON	Off Grid2	Battery starts discharging time
Off_Grid2_OFF		Battery stops discharging time
Off_Grid2_Set		Mode1: ON; Mode2: OFF; Mode3: PROG
Off_Grid2_ Batt_H		Battery starts discharging voltage
Off_Grid2_ Batt_L		Battery stops discharging voltage

Display	Mode	Description
Off_Grid2_ON	Generator	Battery starts working time
Off_Grid2_OFF		Battery stops working time
Off_Grid2_Set		Mode1: ON; Mode2: OFF; Mode3: PROG
Off_Grid2_ Batt_H		Battery **stops** working voltage
Off_Grid2_ Batt_L		Battery **starts** working voltage

Display	Mode	Description
Maintain_ON	Maintain	Generator starts working time
Maintain_OFF		Generator stops working time
Maintain_Set		Mode1: ON; Mode2: OFF; Mode3: PROG

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7 Mode Instructions

AXN-STR offers 7 different system settings that can be adjusted to a variety of needs for individual clients. UPS Mode is the default mode for any situation where the system is not connected with the grid. In cases where grid is connected: Charge Mode/On Grid Mode/Off Grid1 Mode/Off Grid2 Mode become available. The details of each mode is explained below in sections 7.1~7.4. Some modes take precedence over others in certain situations, which will be detailed in section 7.8.

Note: The figures below are the default figures of the system setup.

7.1 UPS Mode

Condition of battery discharging to loads when grid is not available:

Mode	Description	Condition
Mode1:ON	Function at all times.	Battery Voltage: Batt_Discharge: >370V start discharging Batt_Discharge: <350V stop discharging
Mode2:OFF	Does NOT function	
Mode3:PROG	Function periodically.	Battery Voltage: Batt_Discharge: >370V, start discharging Batt_Discharge: <350V, stop discharging Time Setting: UPS_Time_ON : 00:00 start discharging UPS_Time_OFF: 00:00 stop discharging

7.2 Charge Mode

Condition of GRID charging battery:

Mode	Description	Condition
Mode1: ON	Function at all times.	Battery Voltage: Charge_Batt_H : >420V stop charging Charge_Batt_L : <400V start charging
Mode2: OFF	Does NOT function	
Mode3: PROG	Function periodically.	Battery Voltage: Charge_Batt_H : >420V stop charging Charge_Batt_L : <400V start charging Time Setting: Charge_Time_ON: 01:00 start charging Charge_Time_OFF: 04:00 stop charging

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7.3 On Grid Mode (NOT APPLICABLE)

Condition of battery discharging to feed the grid when grid is available:

Mode	Description	Condition
Mode1: ON	Function at all times	Battery Voltage: On_Grid _Batt_H: >390V start discharging On_Grid _Batt_L: <370V stop discharging
Mode2: OFF	Does NOT function	
Mode3: PROG	Function periodically	Battery Voltage: On_Grid _Batt_H: >390V start discharging On_Grid _Batt_L: <370V stop discharging Time Setting: On_Grid_Time_ON: 08:00 start discharging On_Grid _Time_OFF: 17:00 stop discharging

7.4 Off Grid1 Mode & Off Grid2 Mode

Condition of battery discharging to loads when grid is available:

Mode	Description	Condition
Mode1:ON	Function at all times	Battery Voltage: Off_Grid1/2_ Batt_H: >390V start discharging Off_Grid1/2_ Batt_L: <370V stop discharging
Mode2: OFF	Does NOT function Grid supplies loads (ATS bypass)	
Mode3: PROG	Function periodically	Battery Voltage: Off_Grid1/2_ Batt_H: >390V start discharging Off_Grid1/2_ Batt_L: <370V stop discharging Time Setting: Off_Grid1_ON: 07:00 start discharging Off_Grid1_OFF: 22:00 stop discharging Off_Grid2_ON: 08:00 start discharging Off_Grid2_OFF: 16:00 stop discharging

Note: Off Grid1 Mode and Off Grid2 Mode simply offers two separate timers for the day, they do not conflict with each other if their settings overlap.

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7.5 Generator Mode

Condition of generator working time.

Mode	Description	Condition
Mode1:ON	Function at all times	Battery Voltage: Gen_Batt_H: >400V stop working Gen_Batt_L: <376V start working
Mode2: OFF	Does NOT function	
Mode3: PROG	Function periodically	Battery Voltage: Gen_Batt_H: >400V stop working Gen_Batt_L: <376V start working Time Setting: Gen_Time_ON: 01:00 start working Gen_Time_OFF: 04:00 stop working

NOTE:

Generator working time is NOT affected by above mode setting (section 7.1~7.4). When using generator to charge the battery, it must achieve the following 3 conditions.

1) Status of Generator should be YES. (see section 6.3.4)
2) Condition of Generator Mode should be achieved. (see section 7.5)
3) Condition of PV charging should be achieved. (see section 7.7)

7.6 Maintain Mode

Condition of generator working time.

Mode	Description	Condition
Mode1: ON	Function at all times.	
Mode2: OFF	Does NOT function	
Mode3:PROG	Function periodically.	Time Setting: Maintain_ON: 01:00 start working Maintain_OFF: 04:00 stop working

Note: Both Generator Mode and Maintain Mode are related to generator working time, but with different working conditions. Generator mode has to meet 3 conditions simultaneously, and Maintain Mode is simply defined the working time.

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7.7 PV Charging Condition

PV Charging is NOT affected by above mode setting, but it is activated when below two conditions are achieved.

Condition		Voltage	Status
1	PV Voltage (PV_Charge)	>170V~ 500V	start charging
		<150V	stop charging
2	Battery Voltage (Batt_Charge)	>420V	stop charging
		<405V	start charging

7.8 Interaction Between Modes

The modes interaction is limited to certain combinations:

1) When Charge Mode is Mode1 or Mode3 (Timer On), On Grid/Off Grid1/Off Grid2 Mode is not allowed to function.
(Battery can NOT feed into either load or grid when being charged by AC power.)

2) When Off Grid1/Off Grid2 Mode is Mode1 or Mode3 (Timer On), On Grid Mode is not allowed to function.
(Battery can NOT supply load and grid at the same time.)

3) The order of preference the system set is
Charge Mode>Off Grid1/Off Grid2 Mode>On Grid mode

Please reference the chart attached below for further clarification.

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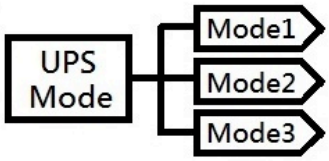
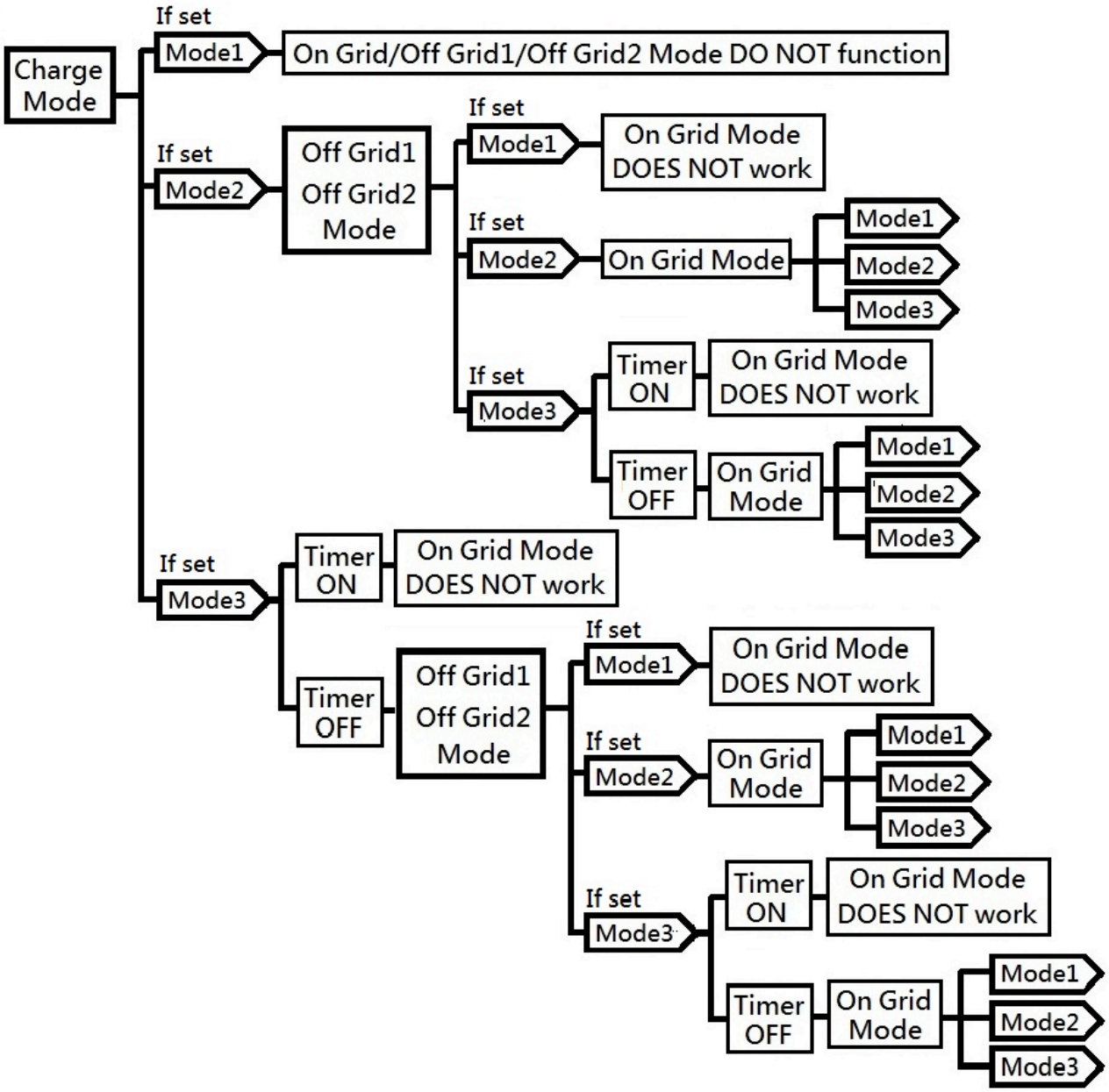
1) When Grid is Unavailable , ONLY UPS Mode will function.



2) When Grid is available, the system wil follow the order of preferences below:
Charge Mode > Off Grid1/Off Grid2 Mode > On Grid Mode



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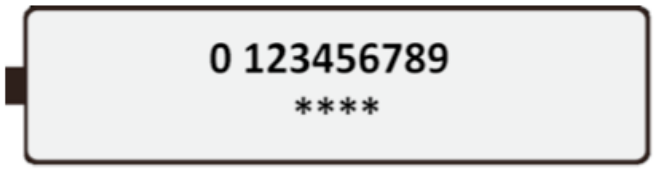
8 Parameter Setting



Enter password to access “8.2 Basic System Setting” and “8.3 Mode Activation Time Setting.” There are two sets of passwords, 4 numbers per code, the first set will allow you access to “8.2 Basic System Setting”; the second set will allow you access to “8.3 Mode Activation Time Setting.”

Push ▲ or ▼ to select a number, press OK to confirm each number, select the 4 numbers in order, when the LCD displays YES, press OK to enter into setup.

As the manufacturer has already completed setup on behalf of the customers upon shipping, we do not authorize clients to make adjustments under normal circumstances. If the need arises, pleases contact distributor for adjustments.

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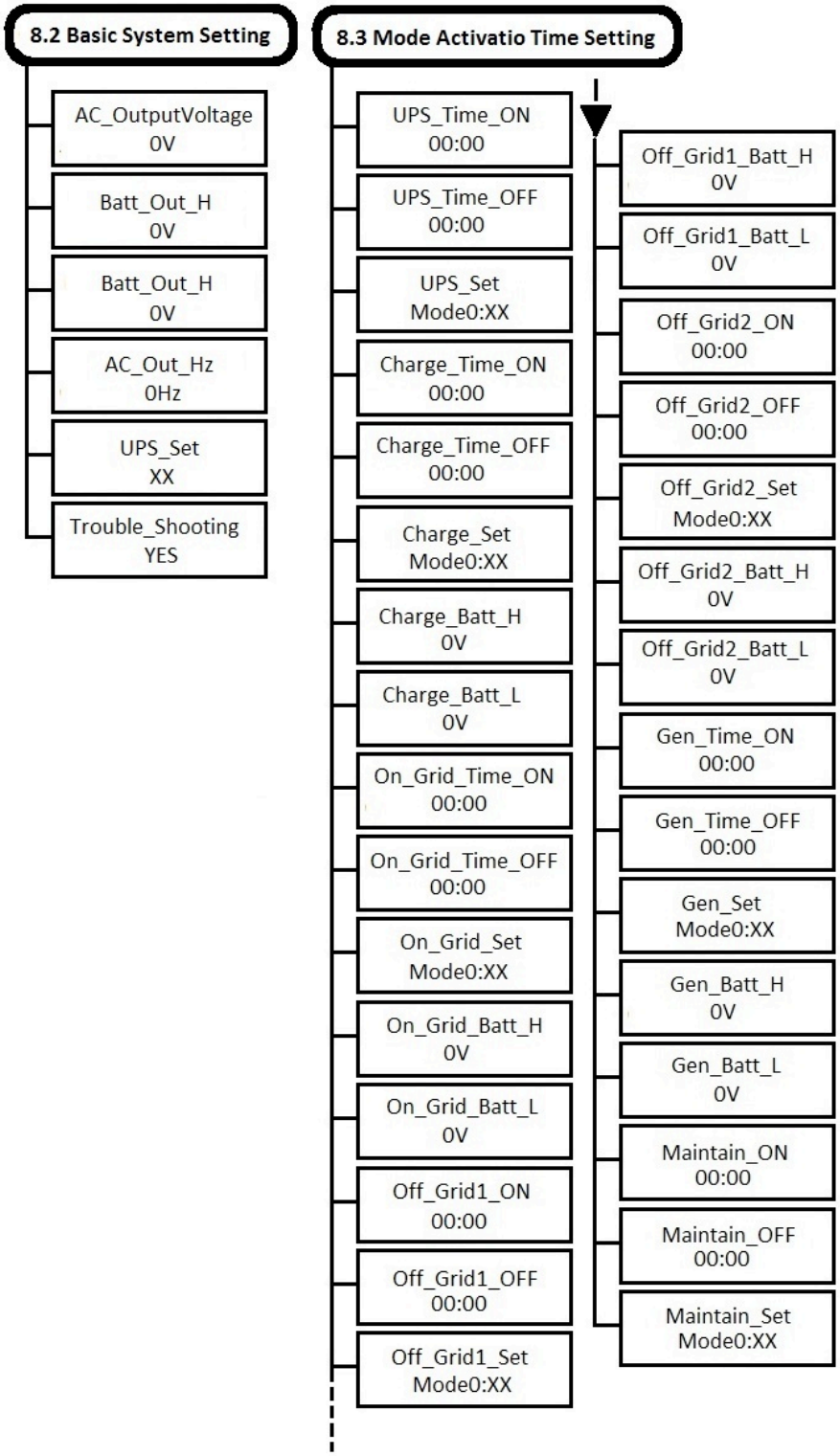
8.1 LCD Display



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8.2 Basic System Setting

Press OK to enter setup, use ▲ or ▼ to change setting, then press OK to confirm.

Display	Default Setting	Available Adjustment Range
AC_OutputVoltage	240V	200V ~ 240V
Batt_Out_H	370V	320V~430V
Batt_Out_L	350V	320V~430V
AC_Out_Hz	--*	50Hz /57Hz / 60Hz
UPS_Set	OFF_LINE_UPS	ON_LINE_UPS OFF_LINE_UPS Night_ON_LINE
Trouble_Shooting	--	Select YES to clean issue (Manual clean issue)
Surge_Protection	High	High /Low

*Set by user when the system is turned on, please refer to section 5

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8.3 Mode Activation Time Setting

Press OK to enter setup, use ▲ or ▼ to change setting, then press OK to confirm.

Display	Default Setting	Available Adjustment Range
UPS_Time_ON	00:00	00:00 ~ 23:59
UPS_Time_OFF	00:00	00:00 ~ 23:59
UPS_Set	Mode1:ON	Mode1/Mode2/Mode3
Display	**Default Setting**	**Available Adjustment Range**
Charge_Time_ON	01:00	00:00 ~ 23:59
Charge_Time_OFF	04:00	00:00 ~ 23:59
Charge_Set	Mode3: PROG	Mode1/Mode2/Mode3
Charge_Batt_H	420V	350V~460V
Charge_Batt_L	400V	350V~460V
Display	**Default Setting**	**Available Adjustment Range**
On_Grid_Time_ON	08:00	00:00 ~ 23:59
On_Grid _Time_OFF	17:00	00:00 ~ 23:59
On_Grid _Set	Mode2:OFF	Mode1/Mode2/Mode3
On_Grid _Batt_H	390V	320V~430V
On_Grid _Batt_L	370V	320V~430V
Display	**Default Setting**	**Available Adjustment Range**
Off_Grid1_ON	07:00	00:00 ~ 23:59
Off_Grid1_OFF	22:00	00:00 ~ 23:59
Off_Grid1_Set	Mode3: PROG	Mode1/Mode2/Mode3
Off_Grid1_Batt_H	390V	320V~430V
Off_Grid1_Batt_L	370V	320V~430V
Display	**Default Setting**	**Available Adjustment Range**
Off_Grid2_ON	08:00	00:00 ~ 23:59
Off_Grid2_OFF	16:00	00:00 ~ 23:59
Off_Grid2_Set	Mode2:OFF	Mode1/Mode2/Mode3
Off_Grid2_Batt_H	390V	320V~430V
Off_Grid2_Batt_L	370V	320V~430V

Display	Default Setting	Available Adjustment Range
Gen_Time_ON	01:00	00:00 ~ 23:59
Gen_Time_OFF	04:00	00:00 ~ 23:59
Gen_Set	Mode3:PROG	Mode1/Mode2/Mode3
Gen_Batt_H	400V	320V ~ 430V
Gen_Batt_L	376V	320V ~ 430V

Display	Default Setting	Available Adjustment Range
Maintain_ON_Set	01:00	00:00 ~ 23:59
Maintain_OFF_Set	04:00	00:00 ~ 23:59
Maintain_Set	Mode3:PROG	Mode1/Mode2/Mode3

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9 Trouble Shooting Guide

9.1 Fault Message and Solution

Once the system error LED turns red, the LCD will display the following messages. (Reference to section 6.3.3)

Display	Description	Solution
Overload	Overload	Decrease volume of load
OFF_GRID_Voltage	Off-grid output voltage abnormal	Check for abnormality in load
GRID_Voltage	Grid input voltage abnormal	Check for abnormality in load and grid input
Frequency	Frequency abnormal	Check if frequency setting is correct or if there is abnormal frequency from grid
Overcurrent	Overcurrent	Check for abnormality in load
Other	When multiple issues occur	Check for all of the above

9.2 Troubleshooting Q & A

Q1) The PV fails to charge the battery when connected with an active solar power system?

A1: Please confirm the following two conditions are achieved simultaneously.

Condition1: PV_Charge: 170V~500V If the voltage is not in range, please adjust PV string size.

Condition2: Batt_Charge: < 405V
Please discharge the battery to 405V

Q2) The red light flash on the LED panel?
A2: When the system has an error it will automatically restart the system once, and then detect further issues for the next 10 minutes. Once the system error is not cleared, please reference to section 6.3.3 and 9.1, and clean the issue.

Q3) The screen blacks out?
A3: Press (SET) for 20 seconds to restart. The screen is sometimes affected by the interference from the load or grid and may cause it to turn blank. If the other LED lights are still functioning, but the screen turns blank, the system is still functioning as normal.

Q4) The grid fails to charge the battery?
A4: 1 Check if the system's timer is in line with the local time zone.
2 Please confirm the charging condition of charge mode is achieved (Reference to section 6.3.5)

Q5) The battery does not discharge to loads when grid is available?

A5: 1 Check if the system's timer is in line with the local time zone.
2 Please confirm the discharging condition of Off Grid1/Off Grid2 Mode is achieved (Reference to section 6.3.5)

Note: If there has the time conflict between Off Grid1/Off Grid2 Mode and Charge Mode, the system will follow the preference of Charge Mode.

Q6) The battery does not discharge to loads when grid is not available?

A6: 1 Check if the battery is full.
2 Please confirm the discharging condition of UPS Mode is achieved (Reference to section 6.3.4 and 6.3.5)

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